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Schoettle et al.

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(54) **ADJUSTABLE HEIGHT GRILL TOP**

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F24B 1/00 (2006.01)

(52) **U.S. Cl.**
CPC ***F24B 1/003*** (2013.01)

(58) **Field of Classification Search**
CPC F24B 1/003
See application file for complete search history.

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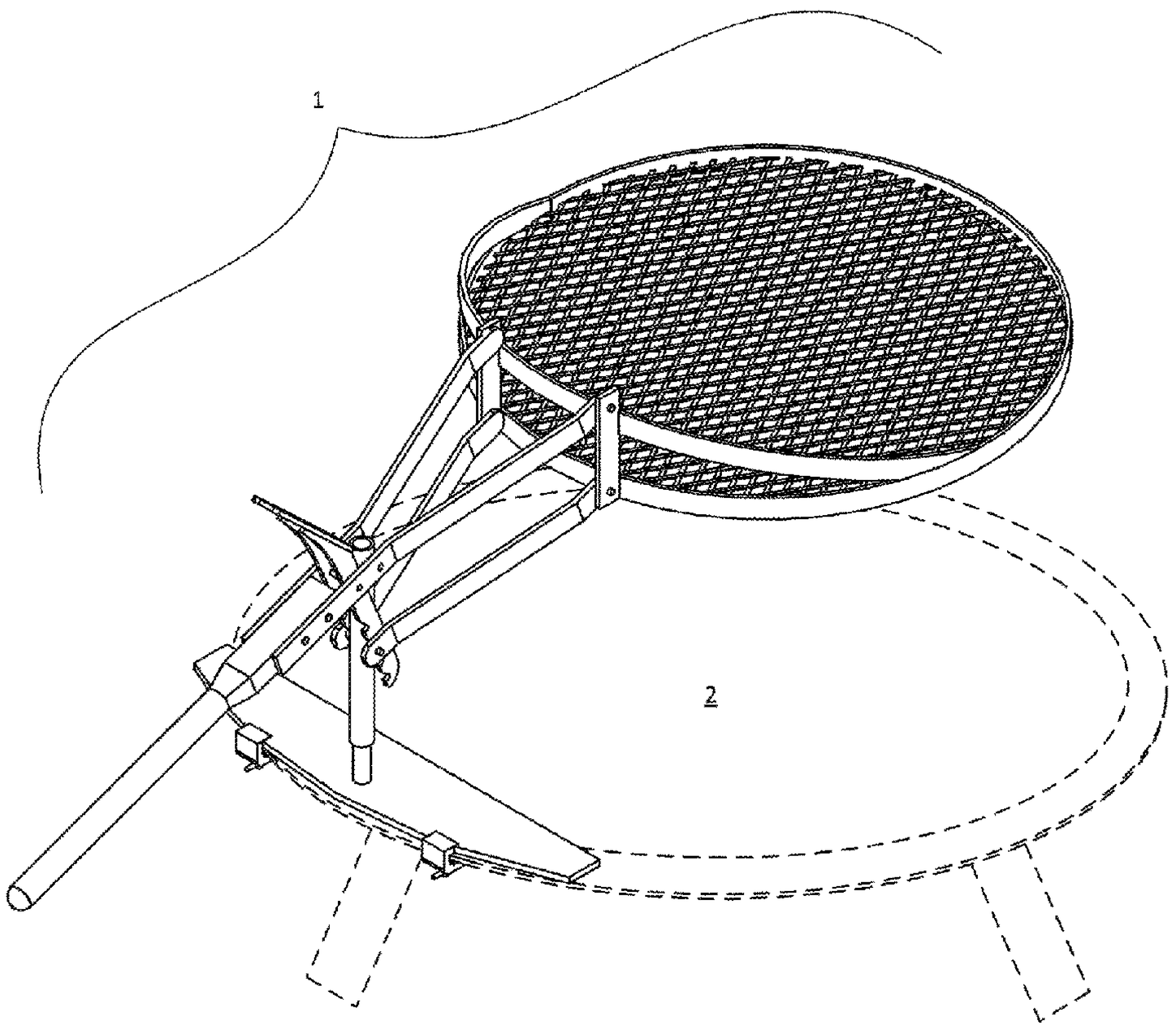
(57) **ABSTRACT**

A grill top that can be removably attached to a barbecue grill fire basin has a lever that adjusts the height of the rack above the fire basin. The lever handle is located well away from the fire. A ratchet mechanism holds the rack at a selected height, and parallelogram bars maintain the rack in a horizontal orientation.

12 Claims, 5 Drawing Sheets



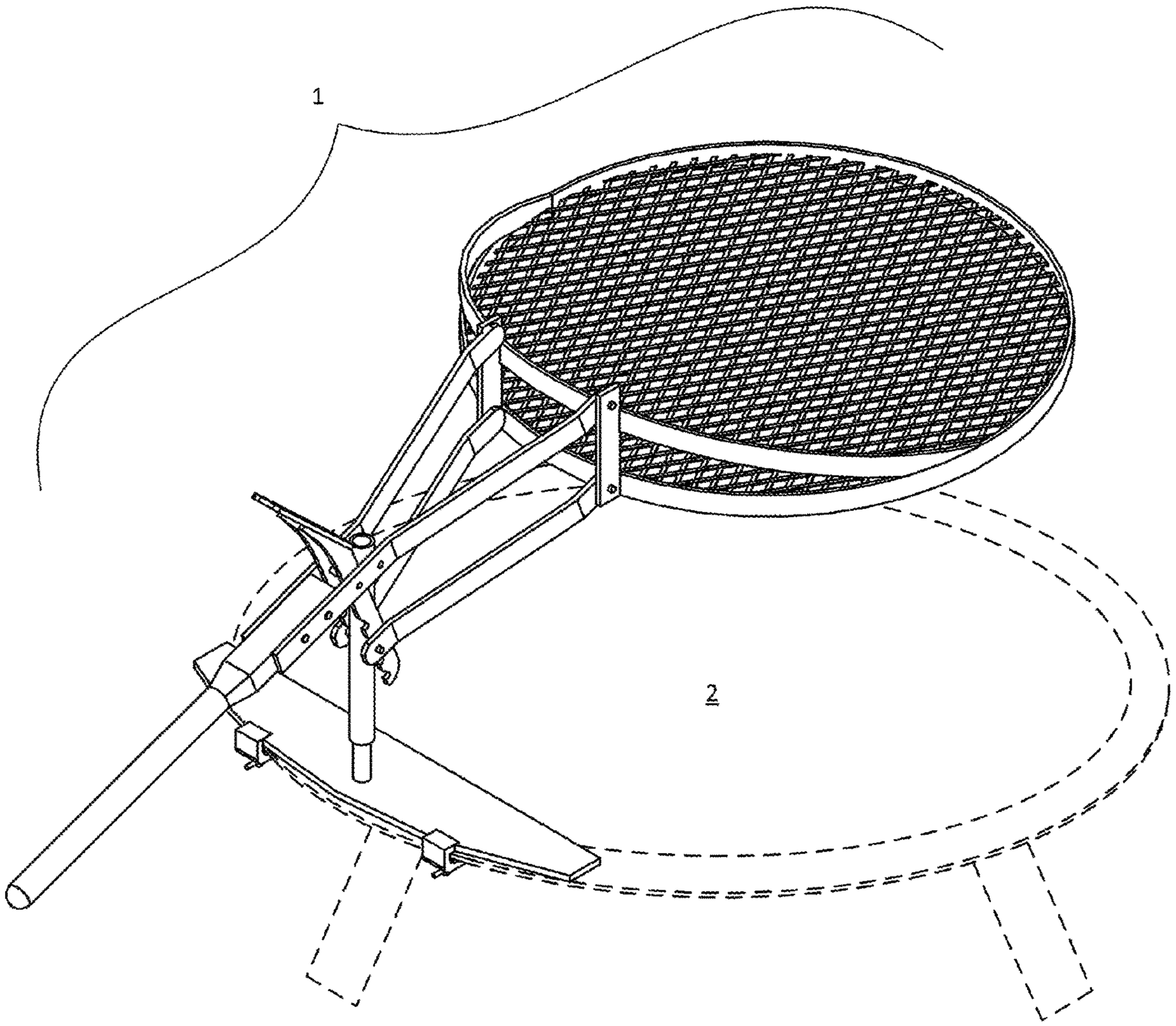


FIG. 1

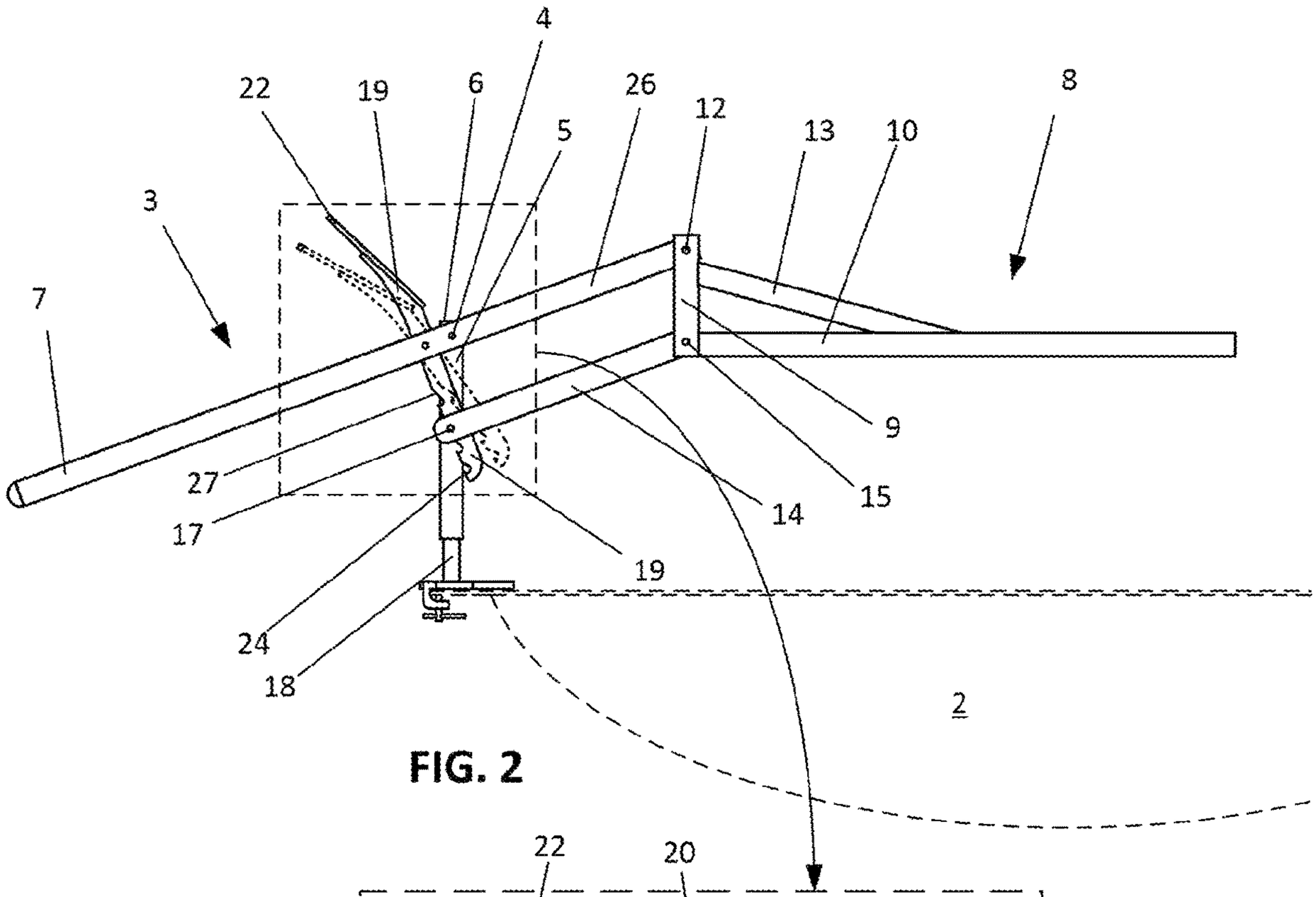

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FIG. 2

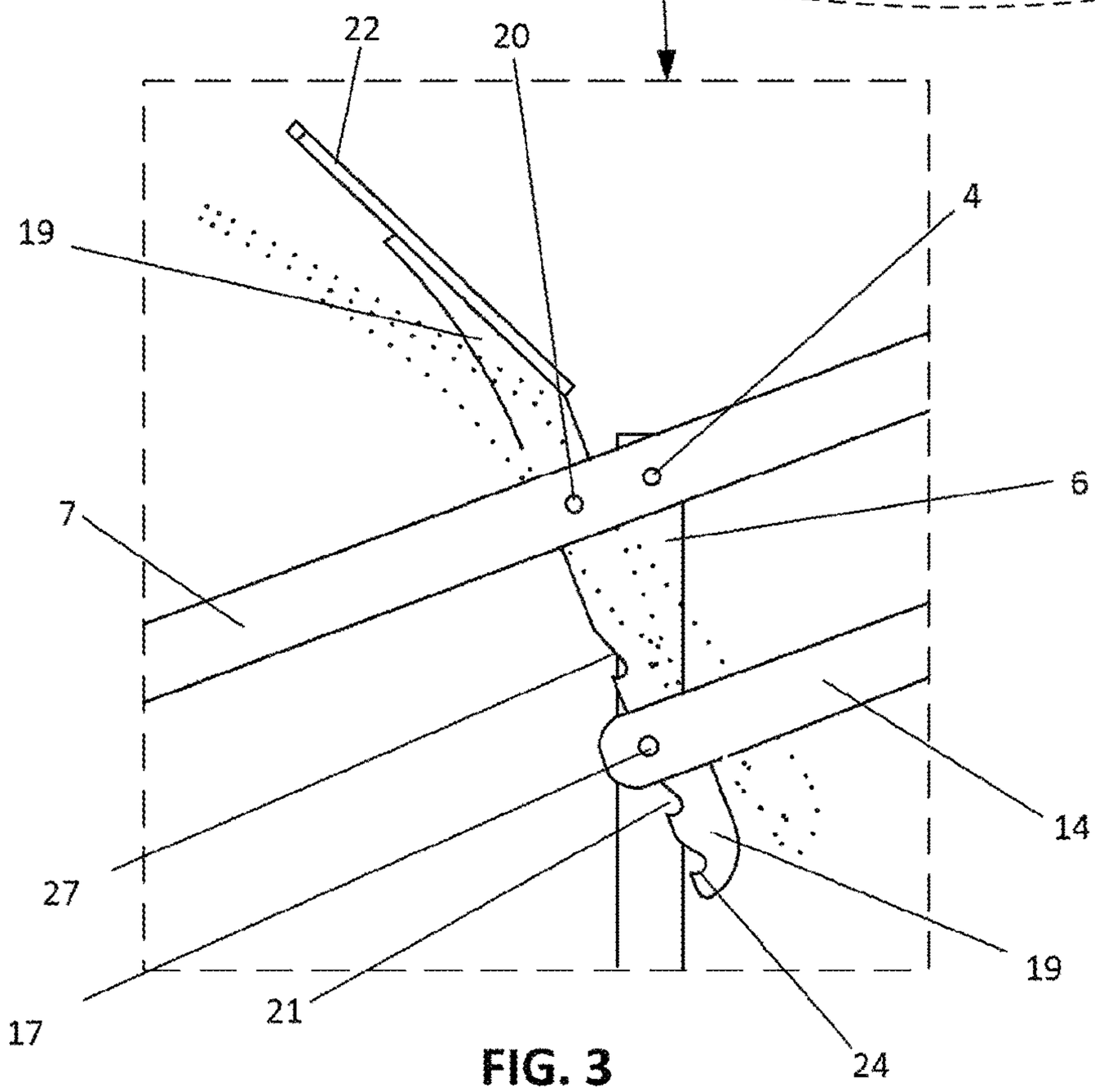
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FIG. 3

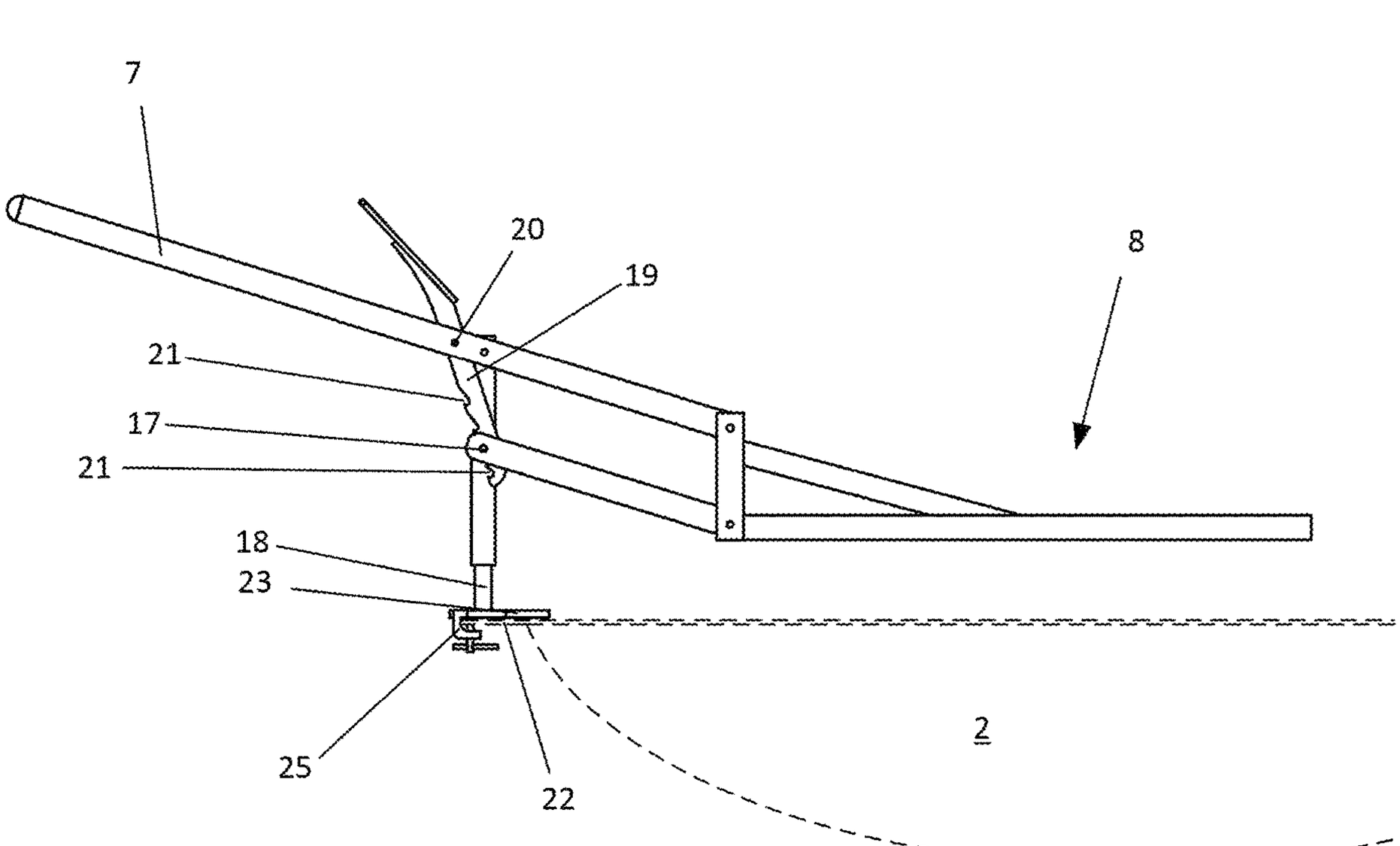

FIG. 4

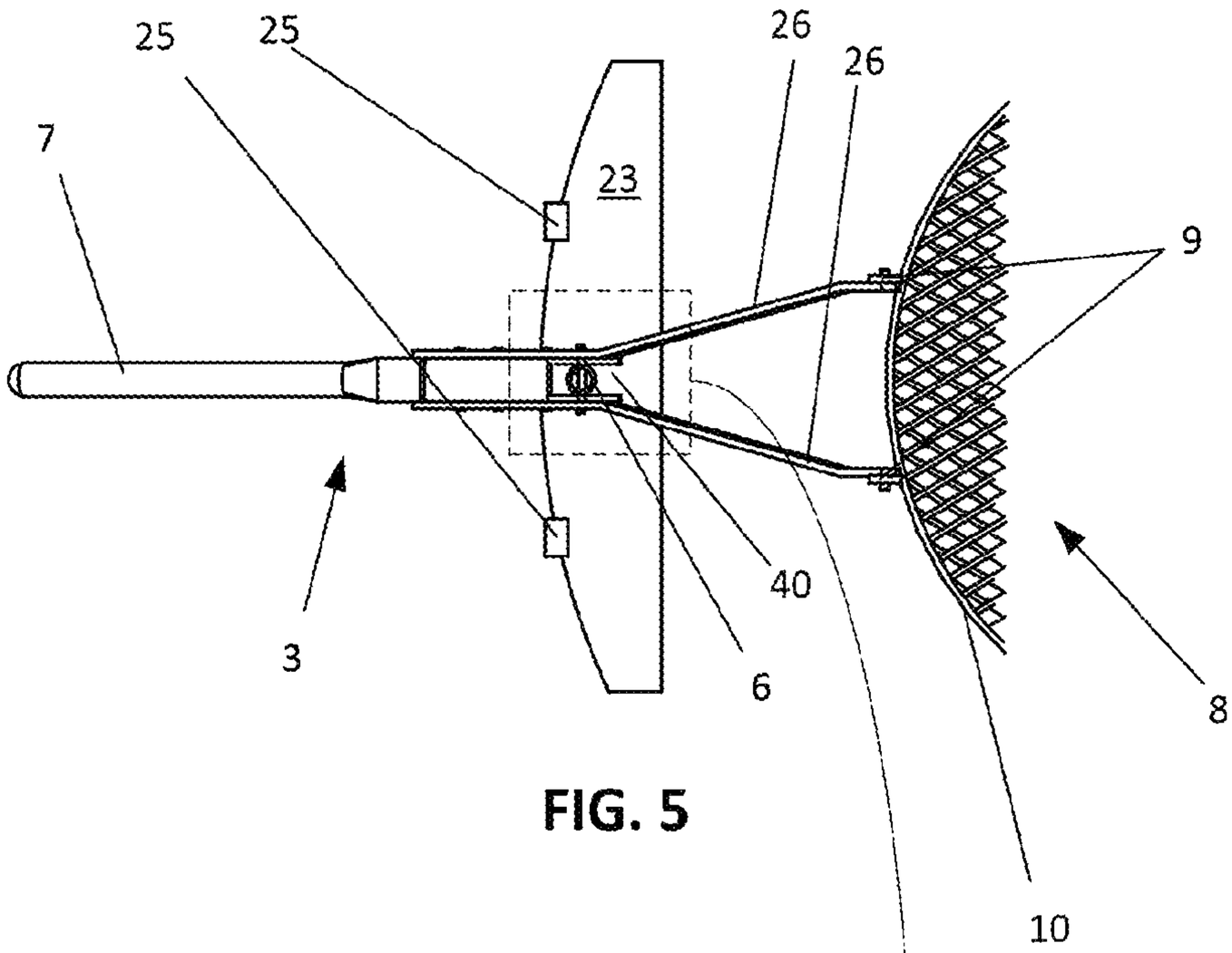
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FIG. 5

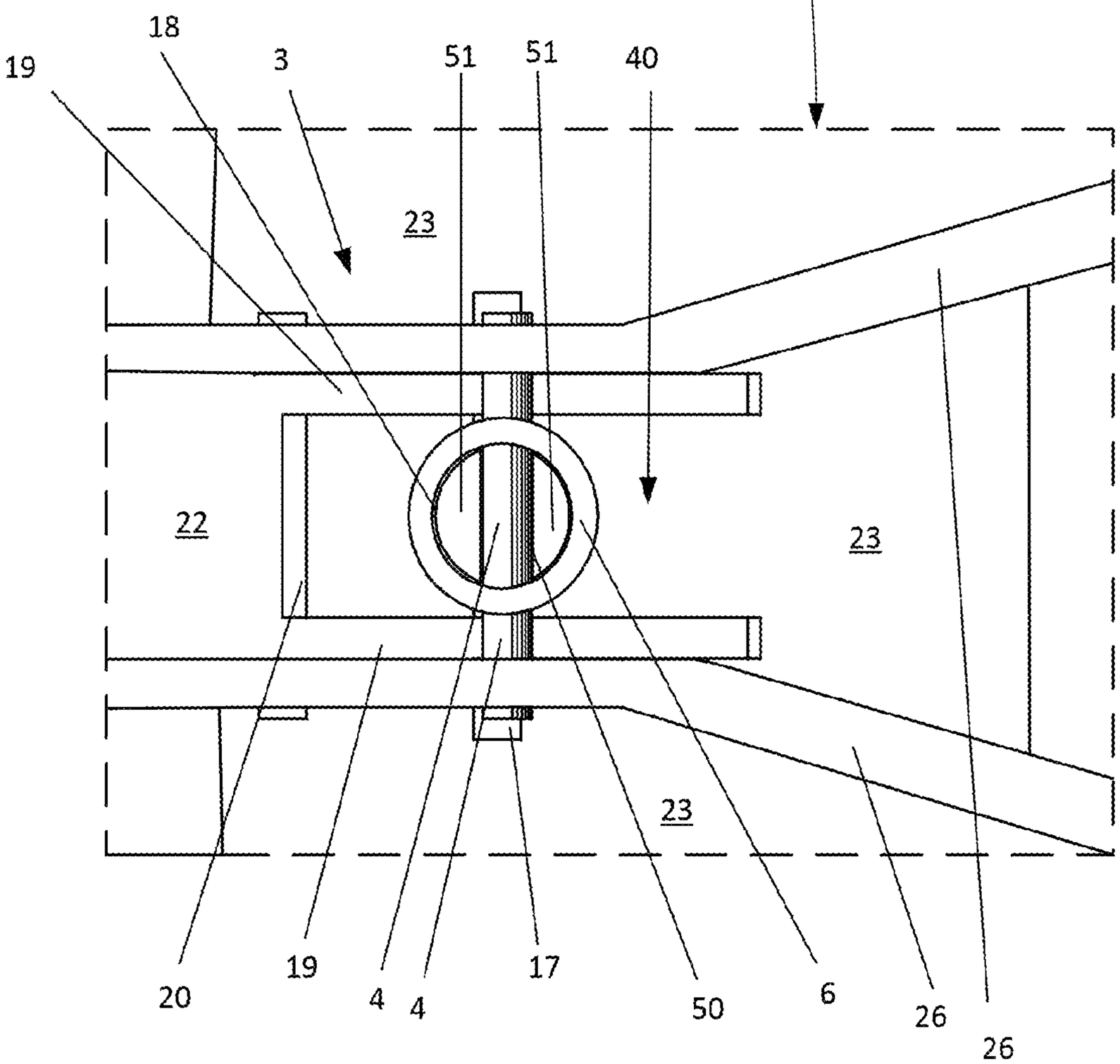
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FIG. 6

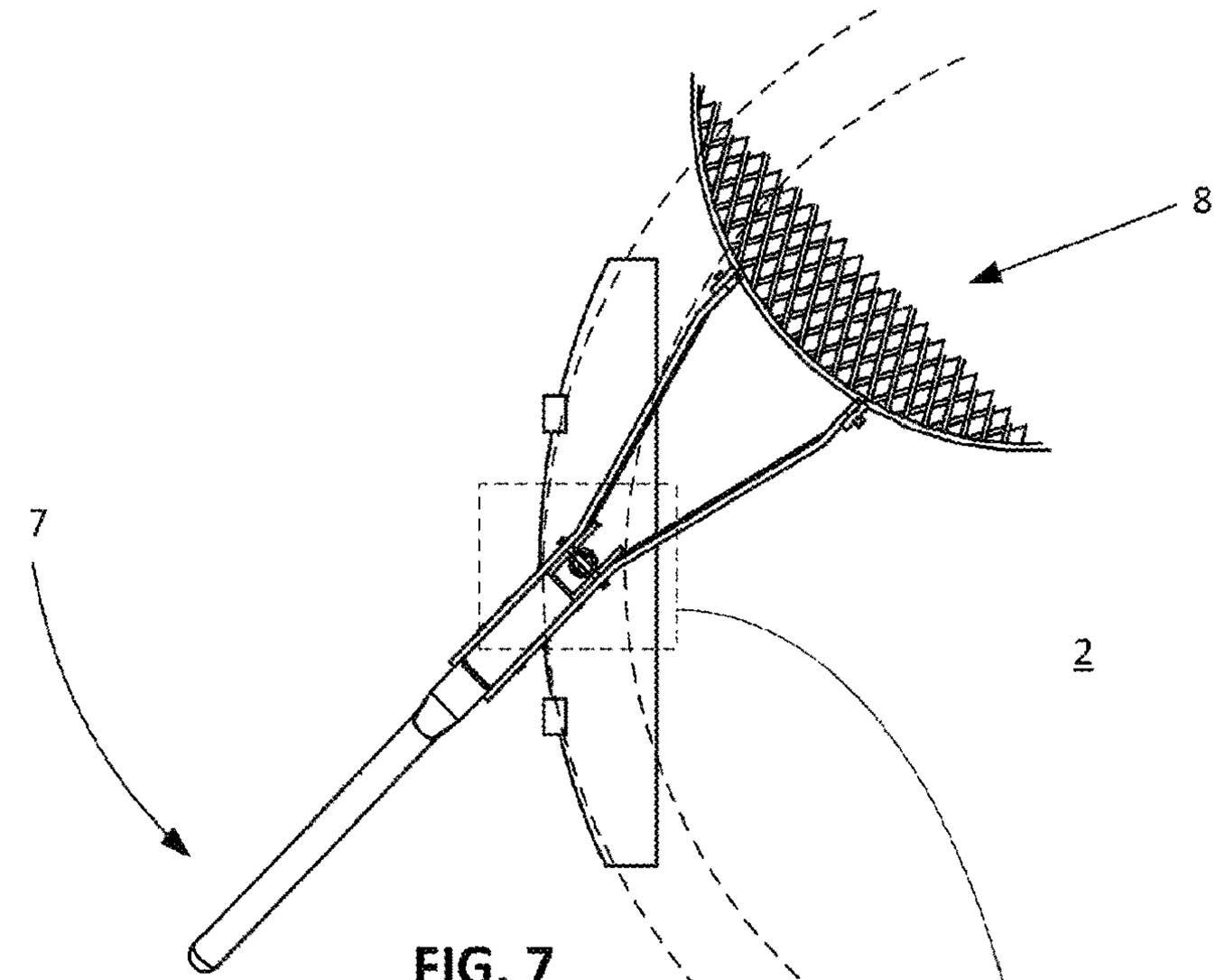

FIG. 7

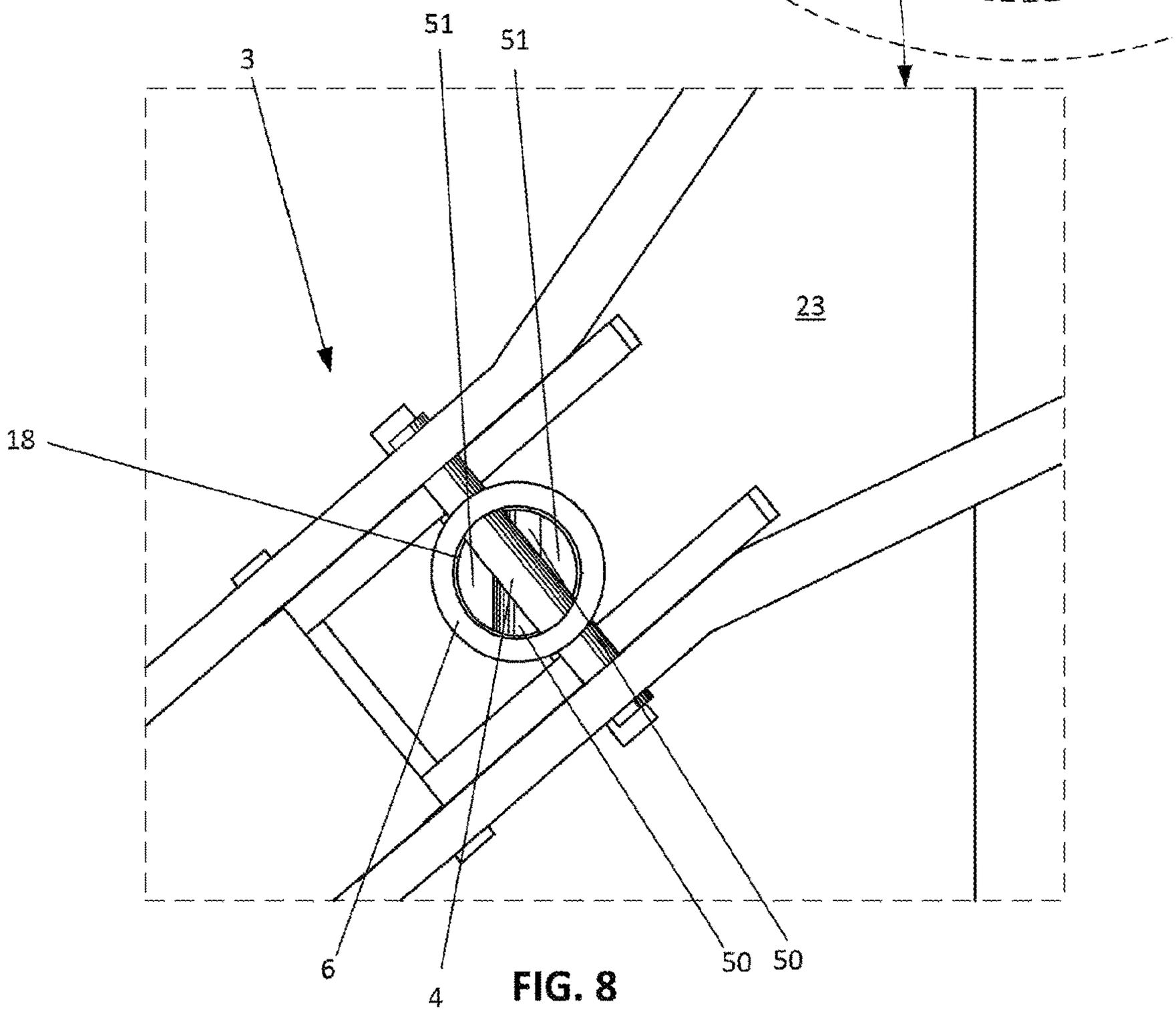

FIG. 8

ADJUSTABLE HEIGHT GRILL TOP

CROSS-REFERENCES TO RELATED APPLICATIONS

Not applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable.

NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT

Not applicable.

REFERENCE TO A BIOLOGICAL SEQUENCE LISTING

Not applicable.

BACKGROUND OF INVENTION

Field of the Invention

This invention is in the field of supports, more specifically in the field of cooking grill tops, more specifically in the field of barbecue grill tops, and still more specifically in the field of grill tops that are adjustable and/or removable from the fire basin of a grill.

Description of the Related Art

In common usage, and particularly in the following description, a barbecue or cooking "grill" refers to an entire apparatus for cooking foodstuffs. The basic sub-components are: the fire box or bowl, which holds the fuel itself or burners, herein called a "fire basin" or "basin," and the grid for supporting the food above the fire, herein called a "rack." The entire apparatus connecting the rack to the basin and supporting it thereon is called the "grill top."

In many grills, the rack may be removable (for cleaning, for example) but is in a fixed position relative to the source of heat. Such grills adjust the heat applied to the food by adjusting the intensity of the fire rather than the position of the food relative to the fire. If the fire is produced by an adjustable fuel such as propane, the application of heat to the food generally does not require moving the food towards or away from the fire. With a charcoal or wood fire, on the other hand, fuel adjustment is often too slow, and quick movement of the food may be necessary.

Some grills, such as the Marsh Allen Cast Iron Hibachi Charcoal Grill Model 30052 by Kay Home Products of Antioch, Ill., allow a rack to be raised and lowered by providing rack-supporting vertical bars at the back of the grill. Pairs of notches are cast into these bars, which engage and hold the rear edge of the rack. A user grasps a handle on the front of the rack and lifts the entire rack, along with the food, out of one pair of notches, and reinserts the rear of the rack into another pair of higher or lower notches. The drawback here is that the racks are necessarily small so that a user can handle the entire weight.

Another type of grill that moves the food relative to the fire is represented by U.S. Pat. No. 3,126,881 to Blotsky. It has a central rack-bearing mast that can be raised and lowered by a lever below the grill. In Blotsky, the lever is pivoted up and down by a threaded crank mounted at the side of the grill. Such an arrangement can handle somewhat larger weight, but has the drawback that when the mechanism is eventually contaminated by ash and dirt, it will be hard to operate and difficult to clean.

BRIEF DESCRIPTION OF THE INVENTION

Objects of the Invention

The principal object of the invention is to allow a large and/or heavy rack of food to be adjusted in height above the fire with little effort. Another object of the invention is to provide such an adjustment means that can be fixed, or removably attached, to a variety of grills or fire basins.

SUMMARY OF THE INVENTION

The present invention is a grill top that can be removably attached to a barbecue grill fire basin, comprising a lever that adjusts the height of the rack above the fire basin. The lever handle is located well away from the fire. A ratchet mechanism holds the rack at a selected height, and an arrangement of parallelogram bars maintains the rack in a horizontal orientation. The lever has a fulcrum that is near the edge of the fire basin. Downward pressure on the lever handle supports the weight of the rack and the food. The length of the handle allows the user to adjust the rack height with a small amount of downward pressure. The rack is connected to the lever by the parallelogram bars. One or more ratchet bars set the height of the rack by fixing the distance between the parallelogram bars. The ratchet bar or bars self-engage the parallelogram bars under their own weight. A user can easily disengage the ratchet bar or bars by pushing a corresponding tab or tabs.

These and other benefits will be more clearly illustrated in the following detailed description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an oblique view of a preferred embodiment of the invention.

FIG. **2** is a side view of a preferred embodiment of the invention.

FIG. **3** is an inset from FIG. **2**.

FIG. **4** is a side view of the invention at a different height setting.

FIG. **5** is a partial top view of the preferred embodiment of the invention.

FIG. **6** is a view of an inset from FIG. **5**.

FIG. **7** is a partial top view of the preferred embodiment of the invention at a different azimuthal angle.

FIG. **8** is a view of an inset from FIG. **7**.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings, in which like reference characters refer to like elements among the drawings, FIG. **1** is an oblique view of a preferred embodiment of the invention **1** attached to a fire basin **2** (shown in dashed lines to indicate environmental structure).

FIG. **2** is a side view of embodiments of the invention including the first embodiment. A handle member **3** pivots, in a vertical plane, on a fulcrum pin **4** on the upper portion **5** of a vertical collar **6**. The fulcrum pin **4** is the first pivot point of a parallelogram arrangement designed to maintain

a grill rack **8** in a horizontal orientation. At the left end of handle member **3** in this view is a handle **7**. The grill rack **8** is attached to the right end **26** of the handle member **3** by means of a vertical lift member **9** attached to the periphery **10** of the grill rack **8**. The right end **26** of the handle member **3** is pivotably attached to the vertical lift member **9** by a second pin at second pivot point **12**. At least one rack brace **13** is fixed between the top end of the vertical lift member **9** and at least one point on the periphery **10** of the grill rack **8** to reduce bending moment at the joint between the vertical lift member **9** and the periphery **10**. The scope of this invention includes equivalent bracing means. A parallelogram bar **14** is pivotably attached at its inner end (end closest to the rack) to the bottom end of the vertical lift member **9** by a third pin at third pivot point **15**, and is pivotably attached at its outer end to a lower portion of the collar **6** by a fourth pin at fourth pivot point **17**.

The collar **6** has a hollow cylindrical inner surface (not visible in this view, see FIGS. **5** and **7**) and is supported by a vertical post **18** that fits within it. Across the cylindrical inner surface of the upper portion **5** is a rigid rod (not visible in this view) that contacts the top of the post **18** and serves as a bearing to hold the weight of collar **6**, and the other parts listed above as well as the food being cooked. Conveniently, this rigid rod can be part of the fulcrum pin **4**.

The height of the grill rack **8** above the fire basin **2** is determined by the length of the normal between the handle **7** and the parallelogram bar **14**, which in turn is governed by the position of the ratchet bar **19**.

FIG. **3** is an enlargement of the dashed rectangular inset shown in FIG. **2**, better showing the details of the ratchet bar **19** and its movement. The ratchet bar **19** pivots about a ratchet pin at a fifth pivot point **20** through the handle member **3**, located to the left of the fulcrum pin **4**. The ratchet pin at the fifth pivot point **20** is raised and lowered, respectively, by raising and lowering handle **7**. The weight of the grill rack and other parts to the right of vertical collar **6** urges the fifth pivot point **20** upward (clockwise about the fulcrum pin **4** in this view) and the weight of the ratchet bar **19** to the right of the fifth pivot point **20** urges the ratchet bar **19** clockwise about the fifth pivot point **20** in this view so that one of the four shaped notches **21** on the left side of the ratchet bar **19** (in this view, the third such notch from the bottom of the ratchet bar **19**) engages a pawl fixed to the lower portion of the collar **6**. This pawl is conveniently made part of a rod perpendicular to the plane of the sheet at the fourth pivot point **17**, which is fixed to the collar **6** and about which the parallelogram bar **14** can rotate in a vertical plane. In this view, the pawl occupies a space (not visible in this view) between the collar **6** and the parallelogram bar **14** that allows one of the four shaped notches **21** to grip the pawl. The shape of the notches **21** includes a hook **24** at the bottom of each notch **21**. The hook **24** resists upward movement of the ratchet bar **19** against the pawl, and consequently resists inadvertent disengagement of a notch **21** from the pawl under the weight of the grill rack. The shape of the notches **21** further includes a smooth upper part **27** of each notch **21**. This feature allows easy release of the ratchet bar **19** from the pawl when the handle **7** is pressed down so as to raise the grill rack.

With downward pressure on the handle **7**, a tab **22** on the ratchet bar **19** can be pressed to the left, moving the ratchet bar **19** to a new position (dotted line) thereby releasing the notch from the pawl and allowing the handle **7** to be raised or lowered. When the tab **22** is released, the weight of the ratchet bar **19** allows another shaped notch on the ratchet bar **19** to grip the pawl.

FIG. **4** is a side view of the invention at a different height setting. Handle **7** has been raised, allowing another of the four shaped notches **21**, the second from the bottom of the ratchet bar **19** in this view, to grip the pawl at the fourth pivot point **17**. The grill rack **8** is now closer to the fire basin **2** than in FIG. **2**. In embodiments, means other than this for releasably setting the height of the grill rack **8** relative to the fire basin **2** may be used, such as a rigid prop of adjustable height.

Also visible in this view is a means for the invention to grip a grill, in this case the horizontal lip **22** of the fire basin **2**. A horizontal plate **23** fixed to the lower end of the vertical post **18** is placed on top of the lip **22** and clamped to the lip **22** by a clamp **25**. The scope of the present invention includes equivalent means known in the art for fastening a vertical post to another object, whether or not that object has a horizontal flange.

FIG. **5** is a partial top view of the preferred embodiment of the invention. It shows that in the preferred embodiment, the right end **26** of the handle member **3** is forked for horizontal stability. There are therefore two vertical lift members **9**. The handle member **3** is also split near its midpoint so that the vertical collar **6** occupies a space **40** within the handle member **3**. This view also shows the horizontal plate **23** and two clamps **25**.

FIG. **6** is a view of an inset from FIG. **5** more clearly showing parts of a top view of detail surrounding and within the collar **6**. The entire weight of the handle portion **3** and grill rack **8** (not shown in the inset) is borne by fulcrum pin **4**. Fulcrum pin **4** passes through the vertical collar **6** and can be fixed to either the handle portion **3** or the vertical collar **6**, but not both, thus allowing the handle portion **3** to rotate in a vertical plane (normal to the sheet plane). The top of the vertical post **18** has a flat horizontal face **51**. Normally, fulcrum pin **4** rests in a semi-cylindrical groove **50** in this flat horizontal face **51** of the vertical post **18**.

Also shown here is that, in the preferred embodiment, the ratchet bar **19** is two halves on either side of the vertical collar **6**, which pivot on a rod at the fifth pivot point **20**. The tab **22** joins the two halves of ratchet bar **19**. Optionally, each half of the ratchet bar **19** can operate separately by dividing the tab **22** in half vertically. Also shown in FIG. **6** are the forked right ends **26** of the handle member **3**, as well as horizontal plate **3**.

FIG. **7** is a partial top view of the invention at a different azimuthal angle from FIG. **5**. Handle **7** has been rotated counterclockwise in this view to move the grill rack **8** away from the fire in the fire basin **2** (shown here in dashed lines to indicate environmental structure).

FIG. **8** is a view of an inset from FIG. **7**. Handle member **3**, fulcrum pin **4** and vertical collar **6** have all been rotated counterclockwise as in FIG. **7**. This has caused the fulcrum pin **4** to leave the semi-cylindrical groove **50** in the horizontal upward face **51** in the top of the vertical post **18**, which remains stationary because the vertical post **18** is fixed to the horizontal plate **23**. By moving out of the semi-cylindrical groove **50**, the fulcrum pin **4** rises a small amount (toward the viewer in this view) to rest on the horizontal upward face **51**. Because of this rise, the semi-cylindrical groove **50** acts as a detent to center the grill rack over the fire basin **2** in its most stable state. Rounding of the top edges of the semi-cylindrical groove **50** will make it easier for the fulcrum pin **4** to release from, and re-enter, the semi-cylindrical groove **50**. Other detent means that operate in an equivalent manner are within the scope of this invention.

In embodiments, the grill top in its most basic form need not have a hollow cylinder around a central post. A second vertical member may be substituted for the hollow cylinder, with means other than cooperating detents to support it while still allowing the two to revolve about each other in a horizontal plane, with or without a detent to urge the grill rack into a position over the fire basin.

Similarly, there need not be a specific vertical lift member **9** attached to the periphery **10** of the grill rack **8** as shown in FIG. **2**. In embodiments, this invention only requires that the right ends of the handle and the parallelogram bar be attached to some vertical portion of the grill rack in parallel relation. For that reason, this invention includes embodiments in which the parallelogram bar is positioned above the handle, as for example if in FIGS. **2** and **3** the positions of the handle **7** and the parallelogram bar **14** were to be swapped. The modifications in these last two paragraphs should also be considered equivalent to the structures described earlier.

The invention claimed is:

1. A grill top, comprising:

a means for attaching the grill top to a grill;

the means for attaching the grill top comprising a substantially vertical post;

the vertical post comprising an axis, an upper end, and a lower end;

the upper end comprising a first detent part;

the lower end comprising a means for gripping a grill;

a substantially vertical collar comprising an upper portion and a lower portion;

the vertical collar comprising a substantially vertical hollow inner surface and an outer surface;

the upper portion comprising a second detent part;

the vertical hollow inner surface fitting slidably over the vertical post;

the vertical collar being supported by the second detent part engaging the first detent part;

the lower portion comprising at least one pawl on the outer surface;

a handle member comprising a handle end, a middle portion, and a rack end;

the middle portion comprising a fulcrum rotatably attached to the upper portion of the vertical collar on the outer surface at a first pivot point;

at least one parallelogram bar comprising an inner bar end and an outer bar end;

a substantially horizontal rack comprising a periphery and at least one vertical lift member fixedly attached to the periphery;

the at least one vertical lift member comprising a top end and a bottom end;

the rack end of the handle member being rotatably attached to the top end of the at least one vertical lift member at a second pivot point;

the inner bar end being rotatably attached to the bottom end of the at least one vertical lift member at a third pivot point a first distance vertically below the second pivot point; and

the outer bar end being rotatably attached the lower portion of the vertical collar at a fourth pivot point the first distance below the first pivot point;

at least one ratchet bar comprising a tab at a tab end, a central portion, and a ratchet end;

the central portion of the at least one ratchet bar being rotatably attached to a fifth pivot point on the handle member located outwardly from the fulcrum;

the tab end and the ratchet end pivoting together about the fifth pivot point so that when the tab is moved outwardly, the ratchet end moves inwardly;

the tab end extending above the handle and the fifth pivot point;

the ratchet end extending below the fifth pivot point and comprising a plurality of outward-facing shaped notches;

the shape of each of the plurality of shaped notches comprising a hook at the bottom of each notch and a smooth upper part;

the ratchet end being biased outward by a ratchet biasing means;

one of the plurality of outwardly-facing shaped notches engaging the at least one pawl; and

the one of the plurality of outwardly-facing shaped notches being released from the at least one pawl by outward pressure on the tab.

2. The grill top of claim **1**, wherein:

said first detent part is a substantially horizontal upward face on said substantially vertical post;

the upward face comprising a shaped groove;

said second detent part is a substantially horizontal rod spanning said substantially vertical hollow inner surface of said upper portion of said substantially vertical collar; and

said ratchet biasing means is the mass distribution of said ratchet bar.

3. The grill top of claim **1**, wherein:

said at least one pawl is two pawls positioned diametrically on said outer surface of said collar;

said at least one parallelogram bar is two parallelogram bars;

said at least one vertical lift member is two vertical lift members; and

said at least one ratchet bar is two ratchet bars.

4. The grill top of claim **1**, wherein:

said means for gripping a grill comprises at least one releasable clamp.

5. The grill top of claim **1**, wherein:

said grill comprises an outwardly-extending horizontal flange; and

said means for gripping a grill comprises a horizontal plate fixed to said lower end of said vertical post;

the horizontal plate comprises an outwardly-facing edge; and

at least one C-clamp fixed to the outwardly-facing edge and shaped to grip the flange when tightened.

6. A grill top, comprising:

a means for attaching the grill top to a grill;

the means for attaching the grill top comprising a substantially vertical first member;

the vertical first member comprising a first axis, an upper end, and a lower end;

a handle member comprising a handle end, a middle portion, and a rack end;

the middle portion comprising a fulcrum rotatably attached to the upper end of the vertical first member at a first pivot point;

at least one parallelogram bar comprising an inner bar end and an outer bar end;

a substantially horizontal rack comprising at least one vertical lift member;

the at least one vertical lift member comprising a second pivot point vertically disposed above a third pivot point;

the rack end of the handle member being rotatably attached to the second pivot point;

the inner bar end being rotatably attached to a third pivot point a first distance vertically below the second pivot point; and

the outer bar end being rotatably attached the lower portion of the vertical first member at a fourth pivot point the first distance below the first pivot point;

at least one pawl on the lower end of the first member;

at least one ratchet bar comprising a tab at a tab end, a central portion, and a ratchet end;

the central portion of the at least one ratchet bar being rotatably attached to a fifth pivot point on the handle member located outwardly from the fulcrum;

the tab end and the ratchet end pivoting together about the fifth pivot point so that when the tab is moved outwardly, the ratchet end moves inwardly;

the tab end extending above the handle and the fifth pivot point;

the ratchet end extending below the fifth pivot point and comprising a plurality of outward-facing shaped notches;

the shape of each of the plurality of shaped notches comprising a hook at the bottom of each notch and a smooth upper part;

one of the plurality of outwardly-facing shaped notches engaging the at least one pawl; and

the one of the plurality of outwardly-facing shaped notches being released from the at least one pawl by pressure applied to the grill top taken from the list consisting of:

(a) outward pressure on the tab;

(b) downward pressure on the handle end; and

(c) both (a) and (b).

7. The grill top of claim **6**, comprising:

a means for biasing said ratchet end outward.

8. The grill top of claim **6**, comprising:

a substantially vertical second member having a second axis and comprising an upper portion and a lower portion;

the lower portion comprising means for gripping a grill;

said substantially vertical first member comprising means for supporting the second member;

the means for supporting the second member allowing the second axis to rotate in a substantially horizontal plane about said first axis.

9. The grill top of claim **8**, comprising:

at least one pawl on the lower end of the first member;

at least one ratchet bar comprising a tab end, a central portion and a ratchet end;

the central portion of the at least one ratchet bar being rotatably attached to a fifth pivot point on said handle member located outwardly from said fulcrum;

the tab end extending above said handle;

the ratchet end extending below said handle and comprising a plurality of outward-facing shaped notches;

one of the plurality of outwardly-facing shaped notches engaging the at least one pawl; and

the one of the plurality of outwardly-facing shaped notches being released from the at least one pawl by outward pressure on the tab end of the ratchet bar.

10. The grill top of claim **9**, comprising:

a means for biasing said ratchet end outward.

11. The grill top of claim **7**, comprising:

a substantially vertical second member having a second axis and comprising an upper portion and a lower portion;

the lower portion comprising means for gripping a grill;

said substantially vertical first member comprising means for supporting the second member;

the means for supporting the second member allowing the second axis to rotate in a substantially horizontal plane about said first axis.

12. A grill top, comprising:

a means for attaching the grill top to a grill;

the means for attaching the grill top comprising a substantially vertical first member;

the vertical first member comprising a first axis, an upper end, and a lower end;

a handle member comprising a handle end, a middle portion, and a rack end;

the middle portion comprising a fulcrum rotatably attached to the upper end of the vertical first member at a first pivot point;

at least one parallelogram bar comprising an inner bar end and an outer bar end;

a substantially horizontal rack comprising a periphery and at least one vertical lift member fixedly attached to the periphery;

the at least one vertical lift member having an upper end;

at least one brace having an inner brace end and an outer brace end;

the inner brace end fixed to the periphery and the outer brace end fixed to the upper end;

the at least one vertical lift member comprising a second pivot point vertically disposed above a third pivot point;

the rack end of the handle member being rotatably attached to the second pivot point;

the inner bar end being rotatably attached to a third pivot point a first distance vertically below the second pivot point; and

the outer bar end being rotatably attached the lower portion of the vertical first member at a fourth pivot point the first distance below the first pivot point;

at least one pawl on the lower end of the first member;

at least one ratchet bar comprising a tab at a tab end, a central portion, and a ratchet end;

the central portion of the at least one ratchet bar being rotatably attached to a fifth pivot point on the handle member located outwardly from the fulcrum;

the tab end and the ratchet end pivoting together about the fifth pivot point so that when the tab is moved outwardly, the ratchet end moves inwardly;

the tab end extending above the handle and the fifth pivot point;

the ratchet end extending below the fifth pivot point and comprising a plurality of outward-facing shaped notches;

the shape of each of the plurality of shaped notches comprising a hook at the bottom of each notch and a smooth upper part;

one of the plurality of outwardly-facing shaped notches engaging the at least one pawl; and

the one of the plurality of outwardly-facing shaped notches being released from the at least one pawl

by pressure applied to the grill top taken from the list consisting of:

(a) outward pressure on the tab;

(b) downward pressure on the handle end; and

(c) both (a) and (b).

* * * * *